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EXECUTIVE SUMMARY OF THE
NATIONAL COMMUNICATION OF

HUNGARY

submitted under Articles 4 and 12 of the
United Nations Framework Convention on Climate Change

In accordance with decision 9/2 of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, the interim secretariat is to make available, in the official languages of the United Nations, the executive summaries of the national communications submitted by Annex I Parties.

Note: Executive summaries of national communications issued prior to the first session of the Conference of the Parties bear the symbol A/AC.237/NC/___.

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Special conditions in terms of the Convention

1. Though the greenhouse gas contribution of Hungary to the overall emissions in absolute values is insignificant, it is quite high in proportion to its population or its gross domestic product. Considering the historical and contemporary emissions in Hungary, the proportionate responsibility for the global environmental problem of the increasing greenhouse gas concentrations was recognised. In 1991, the Government declared that the annual specific carbon dioxide emissions deriving from domestic economic activities will not exceed the averaged annual emission level of the base period accepted for comparison, by 2000. In the light of characteristic features of the process of economic transition, the period of 1985-1987 which precedes the current economic recession is considered as the base period for comparison of the carbon dioxide emissions.

Understanding of the flexibility term

2. The Parliament decision on the ratification in December 1993, took note of this opportunity and considered it reasonable and unavoidable to apply the provision of Article 4.6 of the Convention. Accordingly, the statement submitted with the deposition of the ratification instrument reiterated this claim at least in relation to the carbon-dioxide emissions. As is seen from the assessments, the deep recession which started in the second half of the 1980s reached most of the sectors which are generally the basic sources of the greenhouse gases. For this reason and also for practical purposes we will use the unique base period of 1985-1987 for the base level calculations in the future for all these gases (by deriving mean annual base levels from this period), whilst providing estimates for 1990 for the international comparisons and synthesis.

3. Our understanding of the flexibility term of the Convention in the context of the first national communication is summarised as follows:

- The flexibility term is necessary to set realistic base levels for greenhouse gas emissions, corresponding to a period prior to the beginning of the transition processes. Hungary has chosen the three year period of 1985-1987 to develop an average base year emissions level.

- Due to the lack of research experiences in the subject of greenhouse gas emissions and according to the lack of information and data, the recommended methodology was used for the inventories of carbon dioxide and methane only. The combustion sources and the emission from cement productions are considered in the case of carbon dioxide (CO_2). The calculation of methane (CH_4) emission refers to the fugitive sources, emission from enteric fermentation and rice cultivation.

- At present, economic activities can only be projected for the short-term because of the deep uncertainties related to the transition period. Regarding our commitments under the Convention to stabilise the CO_2 emissions at a level of 1985-1987 by the year of 2000, projections of future greenhouse gas emissions presented in this communication are not extended beyond 2000.

- Although the chapter on policies and measures includes description of several programmes that could lead to reduction of greenhouse gas emissions, the quantitative projections of future emissions are only presented for the energy savings programme as "with measure" and "without measure" scenarios.

National circumstances

4. Hungary is located in the Carpathian Basin in the heart of Europe, its territory amounts to 93030 km^2. Hungary is a typical low-lying country: 73 per cent of its territory is flatland which is less than 200 meters above the sea level. The country belongs to the catchment area of Danube and Tisza and their affluents. The country is located at the shifting frontier between the temperate continental (with hot summer and relatively cold winter) and the Mediterranean (with hot, dry summer and rainy winter) climate zones with complementary effects of the temperate oceanic climate. Southeast part of Hungary belongs entirely to the semi-arid and dry sub-humid climatic belts. The significance of the insufficient precipitation has increased for the last 15 years which might be a dangerous indicator of the increasing drought frequencies for this area.

Transition to market economy

5. The country is in process of substantial socio-economic transition and it became evident that the lasting grave crisis symptoms in the Hungarian economy are basically of a structural origin. These structural changes substantially affect the contemporary and the future emissions of the greenhouse gases and offer a peculiar opportunity to take into account environmental considerations to a better extent during the transition and in the future. The considerable fall in production has not left the industrial structure untouched: half to two thirds of the capacity of industry of several years ago has become superfluous and has been written off for the recent years. In a sectoral analysis, the changes are more obvious. A considerable proportion of the metallurgy, mining and agriculture cooperatives, as well as the electronic and telecommunications industry, and of the artificial fertiliser industry has disappeared. Undoubtedly, new activities have also appeared (e.g. passenger car production).

Recent transition in the energy sector

6. The trend of energy use in Hungary changed in the 1980's after a long period of growth. Rate of growth slowed down in the first half of this decade, and after some years of fluctuation the trend became decreasing from 1987. The decreasing trend of energy demand

stopped in 1992. Total energy consumption was 1.5 per cent higher in 1993 than in the previous year; within that electricity consumption increased by 0.5 per cent. Both the total energy consumption and electricity consumption were again lower in the first half of 1994 in comparison with the identical period of 1993. Domestic primary energy production has been decreasing since 1989 and in 1993 it fell back underneath the level of 1970 with 568.3 PJ. Net energy import -- not including the electricity produced by the single nuclear power plant which used imported nuclear fuel -- is maintained at about 45-49 per cent. Dependency on primary energy import decreased slightly from 53.1 per cent to 51.6 per cent calculated on the ratio of import within total sources. The total energy consumption of the industry was 40 per cent lower in 1993 than in 1987. Electricity demand of 34.9 TWh for 1993 was mostly covered by domestic power plants -- with the share of 13.79 TWh generated by the Paks Nuclear Power Plant and, 17.97 TWh provided by fossil fuelled plants. The share of hydrocarbons in the total energy import amounting to 576.4 PJ in 1993 and consisting of 4.8 Mt (318 PJ) of crude oil and 5.8 billion m^3 (200 PJ) of natural gas, is a slight reduction compared to 1990. The largest reduction took place in the electricity import: net import of 11.1 TWh in 1990 fell to 2.5 TWh in 1993.

International cooperation

7. The Netherlands-Hungary bilateral cooperation in the field of environment is based on a memorandum of understanding between our two environment ministries. The objectives of the project were to elaborate on a possible Hungarian position on climate change, including its consequences for energy production, energy efficiency and related issues. During the last six months (and the remainder of 1994) cooperation mainly focused on the preparation of national communication for the Convention.

8. Another project was initiated by the Norwegian Institute CICERO from the Norwegian Government which focuses on some long-term response policies options for the Hungarian climate-energy strategy. This project started in the first half of 1994 in the framework of Norwegian-Hungarian bilateral environmental cooperation and its emphasis is on determining some (cost-effective) measures for reducing greenhouse gas (GHG) emissions.

9. Under the United States Country Study Programme, a research project was launched in September 1994. The main objectives are the improvement and detailization of an inventory of sources and sinks with prime focus on the sectoral assessments and the development of scenarios and concrete long-term sector-based response policies to assist the national policy planning with particular attention on the energy-savings/efficiency aspects.

Inventories of greenhouse gas emissions and removals

10. One of the principal purposes of greenhouse gas inventories is the identification of main sectors, subsectors and technologies that contribute to the national level anthropogenic greenhouse gas balance either by emission or by removal. A comprehensive and reliable

inventory can be a starting point for projection of mitigation policies and measures and their effects. Although certain first-guess preliminary assessments of greenhouse gas emissions were derived to form the preliminary position regarding the Convention, Hungary has not yet elaborated an emission inventory either by IPCC/OECD or CORINAIR methodology. In view of the lack of appropriate data, the recommended methodology was successively followed in the cases of inventories of carbon dioxide and methane emissions only. Nevertheless, certain simplified estimation for emissions of nitrous oxide (N_2O), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs) are also included in present inventory.

11. Energy data have already been collected in Hungary for more than fifty years and national energy balances have been compiled since the beginning of the 1950's. The energy statistical system changed considerably during the past decades. Two simultaneous energy statistical systems were maintained for a considerable period in Hungary. The first system functioned in the Central Statistical Office, the other one was under the auspices of the Ministry of Industry and Trade. As a consequence of the above mentioned parallelism data of different years supplied for international organisations were sometimes presented by different Hungarian institutions and were differing to some extent so that some of them had to be adjusted later. The determination of greenhouse gas emissions is based on the official Hungarian national energy balance produced and published in particular for the International Energy Agency (IEA) review process.

CO_2 emissions

12. The greatest part of CO_2 emissions is generated by fuel combustion. In the base period it was about 83 Mt/year, but it dropped to 71 Mt by 1990. The result is in accordance with previous estimations although these estimations showed the actual CO_2 emission a little bit higher. The difference can be explained by the fact that the IPCC default emission factors were used for the development of the present inventory. The actual factors may be slightly higher. Regarding the sectoral structure of CO_2 emission concerns, in case of fuel combustion, almost half of the total emission stems from the transformation processes. The share of the residential sector reaches almost 25 per cent of the total CO_2 emission.

13. Uncertainty of CO_2 emission depends not only on reliability of energy consumption data but it is also influenced by the uncertainties in the emission factors. As different emissions have to be taken into account for different types of energy consumption it is important to determine the emission factors for the particular technologies and equipment as precisely as possible. At present the uncertainties of these factors are greater than those of energy consumption or of other energy data.

Greenhouse gas emissions calculated by the recommended IPCC/OECD methodology

	1985-1987 (base period)		1990 (reference year)	
Emission Sources	CO_2[1]	CH_4[1]	CO_2[1]	CH_4[1]
Fuel combustion	80089	7.7	68105	5.6
Fugitive fuel		448.3		366.0
Industrial processes	3587		3568	
Solvent use				
Agriculture		208.4		173.0
Wastes				
Total Emission	**83586**	**664.4**	**71673**	**544.6**
Land use and forestry (removal)	3097		4467	

Greenhouse gas emissions calculated by simplified methods (ktonnes or Gg/year)

	1985-1987 (base period)				1990 (reference year)			
Emission Sources	N_2O[2]	NO_x[2]	CO_2	VOC[3]	N_2O[2]	NO_x[2]	CO_2	VOC[3]
Fuel combustion[4]	8.36	231.4	743.1	91.5	7.25	199.6	733.6	73.5
Fugitive fuel				35.0				25.0
Industrial processes								
Solvent use				78.5				44.5
Agriculture	4.56				4.10			
Wastes								
Total Emission	**12.92**	**231.4**	**743.1**	**205.0**	**11.35**	**199.6**	**733.6**	**143.0**

1 Calculated by IPCC/OECD methodology

2 Estimation methodology based on Tajthy (1993) except for N_2O from agricultural soils which has been calculated by the recommended methodology

3 The base year and reference year for VOC emission calculations is 1988 and 1991, respectively. The estimation methodology was developed by the Institute of Environmental Protection, Hungary

4 Including transport related energy use

Removal of CO_2

14. In Hungary the amount of burning aboveground biomass is negligible. The decrease of forest area (caused by occasional burning, road construction etc.) is fully compensated by reproduction and afforestation. The annual carbon release was 2419 Gg and 3276 Gg in the base period and in 1990, respectively. The carbon uptake was estimated at 845 Gg and 1218 Gg in the same years. In Hungary the net carbon uptake of forests is typically positive. This uptake was also calculated according to the IPCC methodology. The annual value of CO_2 removal was 3097 Gg in the base period and 4467 Gg in 1990.

CH_4 emissions

15. In the present inventory the fugitive fuel emissions, enteric fermentation and rice cultivation as sources of CH_4 emission are taken into account. Such important sources like landfills, wastewater treatment and incineration are omitted due to lack of appropriate data. The fugitive fuel emission from coal mining is considered which gives around 75 per cent of the total methane emissions. This contribution decreased by 20 per cent from the reference year to 1990. In Hungary, coal is produced from both underground and surface mines. It should be mentioned that in Hungary a considerable decrease of coal mining activity is expected in the next decades. Methane emissions from enteric fermentation and rice cultivation are also taken into account. The decrease in methane emission from enteric fermentation is mainly caused by the fall of livestock of cattle and sheep. The emission from rice cultivation is regarded as insignificant compared with other sources.

Description of policies and measures

National Energy Efficiency Improvement and Energy Conservation Programme (NEEIECP)

16. The basic idea of the Programme (NEEIECP) is to set up an operational capability for energy conservation. The main goals of the energy saving programme can be summarised as follows:

- environment protection,
- reducing the dependency on imports,
- saving domestic energy resources,
- postpone the construction and installation of a new basic electric power plants,
- increasing the competitiveness of the economy,
- adjustment to the energy policy of European Union, Organisation for Economic Co-operation and Development /International Energy Agency recommendations.

Targets and key assumptions

17. Two targets for medium-range (5 to 10 years) and an other two for long-term (15-20 years) have been set up. The minimum target supposes that the annual growth rate is expected to decrease up to 1995. Beyond 1995 the annual growth rate would increase by 1-2 per cent/year. It is also assumed that the price system of energy carriers shall reflect the realistic expenditure in the years of 1995 and 1996 and the cross-financing to be ceased. The total potential energy saving capacity is estimated of 200-300 PJ relative to the projected amount for the respective medium and long term periods provided several energy conservation possibilities are fully utilized.

Target	Saved energy	Saved energy cost	Total investment	Relative investment
	PJ	M USD	M USD	M USD/PJ
medium term minimum	63.7	373.0	422.0	6.6
medium term maximum	124.4	708.0	1250.0	10.0
long term minimum	193.4	1120.0	2148.0	11.1
long term maximum	309.3	1739.0	4036.0	13.0

Projections of energy conservation for various sectors

18. As mentioned before, the sectoral savings below are also relative to the respective business-as-usual projections.

19. The total fuel-related consumption in the energy sector might be reduced by 2.3 per cent. The most significant contribution is projected from the efficiency improvement of energy transportation (2.5 PJ) and from the cogeneration (2.7 PJ). The improvement of energy awareness in the production side might lead to an energy conservation of 1 PJ.

20. The industrial energy demand might be reduced by 13 PJ. About half of those might be reached by improving the energy awareness. Other important sources of energy conservation would be the updating the energy technologies in industrial production and the improvement of thermal insulation by 2 PJ and 1.5 PJ, respectively.

21. The agriculture sector has a significant potential in energy conservation of 12 per cent related to the overall sectoral consumption (30 PJ). The primary source of savings would also be the improvement of energy awareness.

22. Energy conservation in the transport sector is estimated to be about 13 PJ. This amount consists of improvement of energy awareness, optimising the public transport cooperation and reduction of energy consumption of vehicles. The savings in the transport sector might amount to about the 25 per cent of the total energy conservation.

23. Overall energy savings in the communal sector (trade, services, governmental institutions and municipalities) are expected to be 9.2 PJ. The main contribution of the conservation is also the improvement of energy awareness by 7 PJ.

24. The energy savings in the residential sector (17 PJ) are the most significant part of total conservation. The primary sources of the efficient use of energy in the households might be the improvement of energy awareness (81 per cent) and the efficiency improvement of consumer's appliances (11 per cent).

Raising public awareness aimed at efficient use of energy

25. In the past ten years there have been three major nationwide energy-saving campaigns in Hungary. The objectives of the last series supported by PHARE were to spread awareness of the facts that:

- there is a direct connection between the consumption of energy and environmental impact (environmental damage),

- it is possible to save energy and at the same time maintain or increase standards of living,

- saving energy is a sign of efficiency and is a positive and straightforward concept; it is possible for each individual to do something and that the actions of each individual matter.

Content and goal of the programme

26. The media campaign made use of television, cinema and press advertising. These were the central elements in the campaign. Television was given an extremely strong weight in order to maximise the reach and the frequency of giving the message to the target audience.

27. The slogan of the campaign was "you pay twice", that is, once for the wasted energy and once for the environmental damage. Press advertising in four national newspapers was used to put over information on energy use and environmental damage. In support of the media campaign, a leaflet was prepared and printed in many copies. A public relations campaign was used to support the media campaign. The campaign was launched and closed with a press conference. A weekly press release was issued each on a different theme -- energy-saving at home, how to save energy in cooking, water use, etc.

28. A schools campaign aimed at children aged 10-14 years was also developed and implemented. In this programme, a leaflet was prepared and disseminated in large number in all elementary schools in Budapest. It gave information on energy use, the environment and energy saving in a simple question and answer format. An integral part of the schools programme was a competition for the children which asked questions about energy use and energy saving.

Conclusions of the campaign

29. There are both positive and negative lessons which can be learned from the project and which should be noted for future energy conservation campaigns:

- Publicity campaigns can succeed in changing attitudes to energy use and the environment in Hungary and such campaigns can even succeed in changing deeply held attitudes.

- The campaign was successful because of the accurate targeting of the message and because the advertisement was creative and had a strong impact.

- The most effective way to influence attitudes in Hungary is through television advertising. This was by far the most important media in the campaign and was responsible for the results achieved.

- Press advertising is useful as a support to television advertising. Cinema advertising appeared to be ineffective.

VOC emission reduction programme

30. Hungary signed the Economic Commission for Europe (ECE) Protocol for the reduction of VOC emissions, in Geneva in November 1991. The participating countries have undertaken to reduce emission levels by at least approximately 30 per cent up to 1999. In several countries including Hungary the "standstill principle" applies. The base year for Hungary is 1988. According to this international agreement, a National VOC Emission Reduction Programme will be implemented in Hungary which is based on the obligations and recommendations of the ECE Protocol.

The Hungarian VOC-emission (Gg)

Source category	1988	1991
Energy production	1.0	1.0
Oil industry (mining, storage, refineries, primary distribution)	35.0	25.0
Transport (incl. refuelling)	90.5	72.5
Solvent use	78.5	44.5
Total	**205.0**	**143.0**

31. The main aim of the VOC Programme is to prepare a strategy consisting of a reduction plan and an implementation plan for the VOC emissions in Hungary. Phase 1 of the project was completed in 1993. The result is a survey of the emission of selected industries in Hungary. Phase 2 of the project should result in a reduction plan for the selected industries such as the graphic industry, metal surface industry, textile printing industry, painting processes, storage of chemical and oil products and the rubber and plastic industry.

32. The following list gives a general outline of measures available which are evaluated for implementation individually or in combination:

- Substitution of VOCs, for example, the use of water-based degreasing baths and paints, inks, glues or adhesives which contain low or no amount of VOCs.

- Reduction by best management practices such as good housekeeping, preventive maintenance programmes or by changes in processes such as closed systems during utilisation, storage and distribution of low-boiling organic liquids.

- Recycling and/or recovery of efficiently collected VOCs by control techniques such as absorption condensation and membrane processes ideally organic compounds can be re-used on site.

- Destruction of efficiently collected VOCs by control techniques such as thermal recatalytic incineration or biological treatment.

33. The estimation of the future VOC emission is calculated on the basis of gross domestic product (GDP) change scenarios. The projected VOC emission outlook for 1995 supposing the successful implementation of the reduction programme ("with measures scenario") is 125 kt while the "business as usual scenario" gives 145 kt with an uncertainty level of 15 per cent. Some percent of the annual growth of GDP is assumed in the period 1995-2000. Therefore, after having ratified the VOC Protocol, several reduction measures

will have to be in force already for that period. So VOC emission outlook for 2000 in the case of "with measure" scenario is 110 kt while in the case of "business as usual" is 170 kt. The estimated uncertainty is 20 per cent.

Enhancement of sink capacities: the forest policy

34. As a result of the large scale, still ongoing national afforestation programme, the forested area of the country has been increased by 600,000 hectare and reached the present rate of 18.2 per cent. or 1.7 million hectare. Various studies on future agriculture in Hungary suggest that about 500,000-1,000,000 ha of currently agricultural land has to be converted to other land use, and the bulk of the non-profitable agricultural land should be afforested. Beside its apparent economical and environmental impacts, this extensive afforestation is expected to solve many problems of rural population and to help in managing unemployment to some extent, which is one of the major actual concerns in Hungary. Unlike in most countries in Europe, an overwhelming majority of the forests is covered by broad-leaved species in Hungary. Conifers are considered mainly as introduced species, but a fairly high proportion of the broad-leaved forests also consists of introduced species, such as black locust and improved poplars. The most characteristic feature of the Hungarian forests is the big variety of mixed, sometimes multistoried stands of broad-leaved species. Nearly all forests in Hungary could be considered as even-aged and artificially established stands.

35. The total growing stock of the productive forests is 237 million m^3, and the majority of the current increment, 9,851 thousand m^3, is also being produced in these forests. The net specific current increment is quite high as compared to the European average. It amounts to 6.2 m^3/ha, whereas the European average is only 4.3 m^3/ha (as of 1990). This is attributable partly to the relatively favourable site and climatic conditions and partly to the relatively high proportion of tree-species of short rotation period. About 27 per cent of the forests, that is, 430 thousand ha, are covered with fast growing species providing 30 per cent of the total current increment.

36. The forestry law currently in force was enacted in 1961. The main objective of this law is to increase forest resources, to maintain and intensify special forest functions and to develop harmonised wildlife management. The forestry law regulates stocked forests, clearings, roads, alleys, nurseries, open lands embraced by forests, that is, all lands under forest management, but it ignores ownership.

37. The increasing public concern over the health of forests, air pollution effects, and the threat of possible climate change focused the public attention on forestry issues. The main emphasis is shifting towards the non-wood benefits of forests, while wood production is controlled by market conditions rather than central decisions. These, as well as the changing ownership structure call for adjustment in forestry policy, which finally should result in a new forestry law.

38. The key issues of the new forest policy to be implemented in the new forestry law, of which certain elements are already in effect in lower level regulations, are as follows:

- to define forest in a complex way with the priority of long term interest for human health, nature conservation and the maintenance of forest resources;
- to define the role of forest in nature conservation, protection, welfare-oriented use and recreation;
- to define the role of forest in wood supply, and the necessary economic and institutional background;
- to define the prerequisites of sustainable management under changing ownership structure, and to develop the system of guaranties of maintaining forest heritage;
- to define the desired ownership structure (the share of state forest is expected to exceed 50-55 per cent on the long run);
- to define the co-ordinating and controlling role of the state in ensuring sustainable management;
- to define the role of foresters, their education and training, and the conditions of their employment;
- to define the role of public relations; finally,
- to define the role of international relationships.

The degree of conformity with international agreements is intended to be as high as possible. Some coincidental contradiction might exist, and imperfect implementation may occur. If any, they will be revised and corrected during the legislation procedure ahead.

Country programme for ODS reduction

39. The use of chlorofluorocarbons (CFCs) in Hungary has reduced dramatically since 1986 due to a great extent to the decline in domestic and local foreign markets. Some manufactures have already ceased to use ozone depletion substances (ODS) as dictated by export markets where destination countries have banned import of equipment containing ODS in line with the Montreal Protocol. This factor continues to be a major influence for companies using CFCs along with the phaseout policy which is now legislated.

40. Hungary is not a producer of regulated substances. There are no ODS production facilities for the substances regulated under the Montreal Protocol nor for the transitional hydrochlorofluorocarbons (HCFC) substances and hydrofluorocarbons (HFC) substitutes. ODS are imported mainly from the European Union and the Russian Federation by Hungarian distributors.

Use of ODS by the end-users in Hungary (metric tonnes)

SUBSTANCES	1986	1989	1991	1992	1993	1994 plan
All CFCs	5360	4750	2660	1880	1668	1120
All Halons	455	440	275	170	65	
CTC (carbon-tetrachloride)	700	630	320	200	124	70
MCF (methyl-chloroform)	570	780	580	447	290	250

Content and goals of the programme

The objectives of the Country Programme for the phaseout of ozone depleting substances are as follows:

- Summarise the usage of ODS including CFCs, halons, 111-trichloroethane or MCF, carbon-tetrachloride and HCFCs in Hungary;
- Present a breakdown of ODS usage by substances for the refrigeration, aerosols, solvents, foams and fire extinguishing sectors and detail the regional distribution of usage;
- Assess the factors that effect ODS demand;
- Identify possible alternative substances and technologies for ODS phaseout;
- Quantify phaseout time scales, incremental costs and environmental benefits;
- Describe the institutional and policy framework of the Country Programme.

41. The foreign trade of ODS (regulated materials) is subject to license in Hungary. The product charges on refrigerators, used oil and refrigerants are in phase of elaboration. The authoritative regulation is set in laws. In order to realise the obligations accepted by the signing of the international agreements, the modification of the customs regulation is a viable tool. The limitation in foreign trade of environmentally harmful materials by the modification of customs regulations is acceptable for the authorities of the General Agreement on Tariffs and Trade (GATT) and of EU with proper reasons. It is important to emphasise that because of the treaty between Hungary and the EU the modifications in the

customs regulation must be in line with the EU. The use of contingents is the most common tool of trade preferences. There is a possibility for suspending the customs for a given period or given goods. In the cases of important economic policy targets through the so-called licensing procedure, the customs on imported goods are to be suspended or reduced. These regulators serve as tools of import limitations but they can promote the preferential import of materials substituting the ODS and machines for processing the substitutes.

Results

42. According to the experiences of the countries initiating the phasing out of ODS, it is most simple to phase out their use as propellants in aerosols: this sector accounted for 50 per cent of the whole national ODS consumption in Hungary in 1986 and consumption dropped to one tenth by 1993. It can be said that firms are aware of the regulations of the Montreal Protocol. They are acquainted with the different technical forms of phasing out and substitution and they use the experiences of other countries but they can not perform similar measures or introduce new ODS technologies because of the declining economic situation. According to the regulation, only 25 per cent of CFCs can be used in 1994 and 1995 compared to the base year and 15 per cent of CTC and 50 per cent of MCF are allowed for use in 1995.

Projection of future greenhouse gas emissions

43. The implementation of the National Energy Efficiency Improvement and Energy Conservation Programme (NEEIECP) is analysed. Due to the prolonged recession of Hungarian economy, the original scenarios made in 1991 during the preparation of NEEIECP had lost their reliability and therefore could not serve as a useful variants for the analysis of future greenhouse gas emission projections. Two updated scenarios are being investigated: a business-as-usual (BAU) scenario and an energy saving scenario (S). The energy saving scenario (S) based on the medium-term targets of NEEIECP. It is assumed that in the year 2000 the effective implementation of NEEIECP would lead to an energy saving of about 60 PJ compared to the BAU-scenario (As mentioned the energy conservation target is about 50-100 PJ up to 2000). The calculations of emission values both for the reference year (1990) and the scenarios are completed using simple macroeconomic method different from the IPCC/OECD methodology.

Projection of CO_2 emission

44. Taking into consideration the scenarios for energy consumption, the future fossil fuel demand should be determined. In the case of the BAU-scenario, the fossil fuel consumption increases in the year 2000 to about 950 PJ while with significant energy savings and conservation it might increase to only 890 PJ. Both in the BAU 2000 and S2000 scenarios the annual fuel-related CO_2 emission does not exceed the base period level. Nevertheless the BAU scenario is higher by 7 per cent compared to the S scenario.

Projection of fuel-related CO_2 emission (Gg) by sectors

SECTORS	1995	2000BAU	2000S
household	15768	17960	16493
service	3858	4144	3 947
transportation	7906	9949	9361
public power plants	19893	22715	21095
district heating	2895	3154	2983
industry	13818	13608	13181
agriculture	1737	1921	1681
Total	**65875**	**73451**	**68741**

Projection of CH_4 emission

45. In determining the methane emissions connected with domesticated and undomesticated animals the default emission factors presented in the IPCC/OECD methodology have been used. The domesticated animal population decreased dramatically in the recent years mainly because of the collapse of the eastern markets. The increase of the export is very uncertain but it might recover in medium-term. There are no generally accepted scenarios for animal livestock, therefore a stock is estimated on expert judgement basis.

Methane emission (Gg) from enteric fermentation and animal wastes

	1990	1992	1995	2000
cattle	115.6	84.6	77.0	99.6
swine	40.8	26.5	25.8	34.0
horse	1.1	1.1	1.1	1.1
sheep	9.4	8.4	8.4	9.4
poultry	3.5	3.0	2.9	3.4
Total	**170.4**	**123.6**	**115.2**	**147.5**

46. It is supposed that in year 2000 the domesticated animal population will be approximately the mean value of the present and the earlier peak stocks. The ratio of cultivated land and forest areas is not expected to modify significantly the "first guess approximation" of the methane emissions and the emissions produced by the different type of lands might be regarded as constant.

47. The future emissions of N_2O, NO_x and CO are also analysed in the communication.

Fulfilment of the CO_2 stabilisation target

48. The Government of Hungary has declared that -- in the light of characteristic features of processes of its economic transition -- the period of 1985-1987 which precedes the current economic recession is considered as the base period for comparison of the greenhouse gas emissions. It is also stated that the carbon-dioxide emission should be returned to the base period level by the year 2000. It should be emphasised that the greenhouse gas emission reduction target therefore refers to stabilisation of carbon-dioxide emission at a level of 1985-1987.

The fulfilment of CO_2 reduction target

	CO_2[1] (Gg/year)	CH_4[2] (Gg/year)
base period (1985-1987)	81534	604.9
reference year (1990)	69116	491.6
1995	65875	310.1
2000BAU	73451	232.2
2000S	68741	

[1] The recent fuel-related CO_2 emission calculated by the recommended methodology and the future projection of fuel-related CO_2 emissions estimated by simplified method are compared. The projection is presented as "with measures" (2000S) and "without measures" (2000BAU) scenarios regarding the implementation of the National Energy Efficiency and Energy Improvement Programme. (The net emissions including the non-combustion sources and removals are not calculated in the projections. The difference between the net CO_2 emission and fuel-related ones is less than 5 per cent)

[2] Accordingly, the methane emissions from fugitive sources and enteric fermentation for the base period and the reference year are derived from the IPCC/OECD methodology. The future projection of methane emission from same sources is based on the referred macroeconomic method. (The net emissions including the fuel related methane sources are not calculated in the projections. The difference between the net CH_4 emission and emission from fugitive and enteric fermentation is less than 2 per cent).

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EXECUTIVE SUMMARY OF THE
NATIONAL COMMUNICATION OF

PORTUGAL

submitted under Articles 4 and 12 of the
United Nations Framework Convention on Climate Change

In accordance with decision 9/2 of the Intergovernmental Negotiating Committee of the Framework Convention on Climate Change, the interim secretariat is to make available, in the official languages of the United Nations, the executive summaries of the national communications submitted by Annex I Parties.

Note: Executive summaries of national communications issued prior to the first session of the Conference of the Parties bear the symbol A/AC.237/NC/___.

GE.95-63375

Copies of the national communication of Portugal
can be obtained from:

Ministry of Environment and Natural Resources
Rua C Aeroporto de Lisboa
1700 Lisbon
Fax No. (351 1) 597 8515

NATIONAL CONTEXT

1. Portugal is located on the extreme Southeastern point of Europe with a coastline of approximately 800 kilometres and shares a 1,200 kilometre border with Spain. It also has two archipelagoes, Madeira and the Azores, in the Atlantic Ocean.

2. It has a temperate climate with average annual temperatures of between 10°C and 20°C. The average annual rainfall varies between 3,100 mm in the mountainous inland Northern regions and 400 mm on the Southern coast.

3. There were approximately 9.9 million inhabitants in Portugal in 1992 after the occurrence of growth during the eighties. National territory is mainly characterized by various medium sized centres, a significant dispersion of small communities and the two metropolises of Lisbon and Oporto which, as a whole, account for 38 per cent of the citizens on the mainland. On the other hand, 20 per cent of the population live in communities of less than 200 inhabitants.

4. The major cities of Lisbon and Oporto are responsible for around 50 per cent of gross domestic product (GDP) with 80 per cent of employment being concentrated along the Central/Northern coastal area of the Country.

5. Approximately 45 per cent of the mainland territory is used for agricultural purposes. There has been an expansion occurring in areas used for permanent crops as opposed to arable soil. Forests and other arboreal plantations cover approximately 36 per cent of the territory, mainly in the form of Scotch Pine, Hispania Oak, Holm Oak and Eucalyptus. Animal breeding is respectively split up among, fouls, pigs, cows and goats.

6. The national economy during the eighties was characterized by two different stages. The first stage, particularly during the 1982/1990 period in which there was an approximate drop of 2 per cent in GDP per annum and a second, between 1985/1990 in which GDP grew at an average rate of 5 per cent per annum which was one of the highest rates in the Organisation for Economic Co-operation and Development (OECD) although GDP per capita is still one of the lowest.

7. There was a considerable improvement in the unemployment and inflation indicators in 1992 which were respectively 4.1 per cent and 8.9 per cent. A significant contribution was made by Portugal's membership of the European Community in 1986 which helped to reinforce the means for compensating economic insufficiency and re-dimension economic activity and professional training.

8. Trade accounts for 28 per cent of GDP with the share of imports of semi finished and capital goods being 74 per cent with 11 per cent for energy products. Exports are still concentrated on traditional products.

9. Employment for the active population is around 35 per cent in the industrial and 20 per cent in the agricultural sectors.

10. Housing, in 1992, had very high rates of coverage ($\geq$ 94 per cent) for water and electricity and slightly lower rates for sanitary installations. There is still a certain degree of imbalance in interior regions.

11. Energy consumption in Portugal is heavily dependent on foreign sources ($>$ 80 per cent), mostly in the form of oil products ($\geq$ 70 per cent). There was an average annual growth of 5.9 per cent during the 1985/1990 period, particularly in the transport and residential/services sectors. Energy intensity is, however, far higher than the average for OECD countries in spite of the efforts being made to encourage the more efficient use of energy.

12. The rate of growth of vehicle usage, albeit having expanded very quickly, is still lower than the OECD average. The growth in the number of vehicles and traffic has been more marked in the private transport sector, both for private use and the carriage of goods although rail transport, as yet, is not as significant as it should be.

INVENTORIES

Anthropogenic Emissions

13. A national inventory was prepared for 1990 on the emissions of sulphur dioxide (SO_2), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), methane (CH_4), carbon monoxide (CO), carbon dioxide (CO_2), ammonia (NH_3) and nitrous oxide (N_2O) using the methodology approved by the CORINAIR project, developed by the European Union Commission. These estimates for the different categories of sources, which were compiled for the CORINAIR inventory, were grouped together or, when necessary, split up, in order to obtain the data in the format proposed by the Intergovernmental Panel on Climate Change (IPCC).

14. The results have been summarized in Table 1 from which it can be concluded that combustion procedures, in Portugal, were the main sources of the emission of gases responsible for the greenhouse effect.

15. The only exception is CH_4 with a total emission of 227Kt, whose principal sources of emission are essentially in the agricultural sector although the contribution of the processing and deposition of wastes has not played an inconsiderable role.

16. Reference should be made to the contribution ($>$90 per cent) of NO_x, CO and CO_2 to combustion processes. Total emissions were 2145Kt, 1*MT* and 42*MT* respectively in which transport accounts for a considerable proportion.

Table 1 Results of the inventories of gases responsible for the greenhouse effect

Categories	Emission Estimates (Gg of full mass of pollutant)					
	NOx	NMVOC	CH_4	CO	CO_2	N_2O
NATIONAL NET EMISSIONS	214,5	199,5	226,7	1 082,6	42 148,4*	10,6
1A FUEL COMBUSTION	210,1	109,4	13,0	1 072,0	38 686,3*	5,0
1A1 Energy Transformation Activities	59,6	11,3	2,4	68,2	19 386,3*	3,0
1A2 Industry (ISIC)	17,8	3,0	2,1	264,3	6 079,0*	1,4
1A3 Transport	108,6	81,4	1,4	614,1	9 946,5*	0,4
1A4 Commercial - Institutional	1,6	5,6	3,7	63,2	1 045,0*	0,1
1A5 Residential	1,4	4,8	3,2	53,8	891,0*	,1
1A6 Agriculture-Forestry	21,1	3,4	0,2	8,4	1 338,1*	0,0
1A7 Other	NA	NA	NA	NA	NA	NA
BIOMASS COMBUSTION FOR ENERGY	11,1	12,7	8,3	436,0	6 773,5	0,7
TRADITIONAL BIOMASS COMBUSTION FOR ENERGY	NA	NA	NA	NA	NA	NA
1B FUGITIVE FUEL EMISSIONS	NA	7,6	2,0	NA	NA	NA
1P1 Crude Oil Production	NA	7,6	0,0	NA	NA	NA
1B2 Coal Mining	NA	NA	2,0	NA	NA	NA
2 INDUSTRIAL PROCESSES	4,4	15,4	0,4	10,7	3 462,1	1,9
2A Iron and Steel	NA	0,1	NA	10,7	35,0	NA
2B Non Ferrous metal	NA	NA	NA	NA	2,7	NA
2C Inorganic Chemicals	1,7	1,4	0,4	0,0	277,5	1,9
2D Organic Chemicals	NA	4,7	0,0	NA	NA	NA
2E Non Metallic Mineral Products	NA	NA	NA	NA	3 140,2	NA
2F Other (ISIC)	2,6	9,2	0,0	0,0	6,7	0,0
3 SOLVENT USE	NA	67,1	0,0	NA	NA	NA
3A Paint Application	NA	26,3	0,0	NA	NA	NA
3B Degreasing and Dry Cleaning	NA	2,4	0,0	NA	NA	NA
3C Chemical Products Manufacture or Processing	NA	6,3	0,0	NA	NA	NA
3D Other	NA	32,2	0,0	NA	NA	NA
4 AGRICULTURE	NA	NA	176,3	NA	NA	3,6
4A Enteric Fermentation	NA	NA	104,8	NA	NA	NA
4B Animal Wastes	NA	NA	58,6	NA	NA	NA
4C Rice Cultivation	NA	NA	12,9	NA	NA	NA
4D Agricultural Soils	NA	NA	0,0	NA	NA	3,6
4E Waste Burning	NQ	NQ	NQ	NQ	NQ	NQ
4F Savanna Burning	NA	NA	NA	NA	NA	NA
5 LAND USE CHANGES	NQ	NQ	NQ	NQ	NQ	NQ
6 WASTES	NA	NA	35,2	NA	NA	NA
6A Landfills	NA	NA	33,4	NA	NA	NA
6B Wastewater	NA	NA	1,8	NA	NA	NA
6C Other	NA	NA	NA	NA	NA	NA

* Does not include emissions from combustion of biomass
NA - Not applicable
NQ - Not quantified

17. In the case of NMVOC, whose total emissions were around 200Kt, reference should be made to industrial processes and the use of solvents as major factors, whereas in the case of N_2O, combustion and agricultural processes were major contributing factors for the emission of 10Kt in 1990.

18. These results do not include emissions from the use of fuel by aircraft and marine transport which, although having been calculated (see table 1) have not been included in the national totals.

Sinks

19. Portuguese agriculture, owing to its level of development in comparison to the agriculture of the rest of the European Union (EU) has low emissions levels of pollutants and a reasonably satisfactory situation with regard to the concentration of CO_2.

20. Accordingly, although of significant national importance with regard to emissions of CH_4 and N_20, its contribution to the annual concentration of CO_2 of 70.4*MT* represents a reasonably positive factor.

POLICIES, MEASURES AND EFFECTS

Agricultural Sector

21. The European Union's current common agricultural policy is targeted at reducing incentives to agricultural production, and therefore, several support measures which have been introduced, that is, those concerned with environmental protection, encourage the extending of vegetable production and animal breeding activities, therefore reducing emissions.

22. Forestry measures, on the other hand, by encouraging the maintenance, expansion and protection of forests, will help to reduce or stabilise the levels of CO_2 in the atmosphere owing to their important roles as sink-holes.

Energy Sector

23. The major energy sector policies which have been put into practice are, in general, compliance with the policy objectives of environmental protection and encompass three major priorities:

- An increase in diversification and energy efficiency in all sectors of economic activity;
- The use of clean technologies in the burning of fossil fuels;
- Greater use of renewable resources.

24. The main areas of activity to be put into practice in the energy sector, include:

- The introduction of natural gas for the production of electricity and end use starting in 1997;
- The combined production of heat and electricity in various industrial subsectors;
- An increase in the use of renewable energy sources for energy production;
- Improvements in the efficiency of thermal power stations and electricity transmission facilities;
- The more rational use of energy in all end user sectors.

Industrial Sector

25. Portuguese industry has, during the first five years of its membership of the European Union, accompanied the rate of growth of GDP, although there have been major regional asymmetries -- a greater concentration of production and employment in the Northern, Central and Lisbon and Tagus Valley Regions -- and a significant degree of vulnerability to outside forces, resulting from the fact that the manufacturing sector is dominated by the traditional, labour intensive, high energy consuming sectors.

26. Reference should be made to the fact that there are signs of a broadening of the industrial specialization base, taking into account the major activity of the metal and electrical material sectors as well as several production sectors such as wood and cork, ornamental stones and automobiles.

27. Today's industrial development model includes living and environmental standards which attempt to emulate the current worldwide development model.

Surface Transport Sector

28. There was a considerable expansion in the number of vehicles during the eighties which was a period of major growth although the numbers are still below the average OECD levels.

29. The vehicles/kilometre ratio indicates a total increase in traffic of 67 per cent. This has caused an approximate 58 per cent rate of growth in fuel consumption in the eighties.

30. Demand for the various means of surface transport, has concentrated on road as opposed to rail transport although the opposite is expected to be the case in the future, as policy measures in the sector are targeted at strengthening the competitiveness of rail transport.

31. Important investments in both road and rail infrastructures have been made and more are expected. This will be particularly the case with international connections and in respect of the network of inter and multi-modal terminals and interfaces.

PROJECTIONS OF CO_2 EMISSIONS

32. Activities for the production and use of energy are the major anthropogenic sources of pollutants responsible for the greenhouse effect.

33. Based on an energy demand situation which has been prepared on the basis of the most probable development scenario, Portugal has prepared CO_2 emission projections resulting from combustion for the years 1995 and 2000 the results of which are set out in the following table.

Table 2
Projections for CO_2 emissions in Gg produced by combustion (Category 1A)

CATEGORIES	1990	1995	2000
1A Fuel combustion	38 686	46 024	54 274
1A1 Energy Transformation Activities	19 386	21 180	24 308
1A2 Industry (ISIC)	6 079	7 143	8 911
1A3 Transport	9 946	13 389	16 140
1A4 Commercial - Institutional	1 045	1 273	1 404
1A5 Residential	891	1 085	1 196
1A6 Agriculture - Forestry	1 339	1 953	2 315

Source: Institute of Meteorology
Rates of Growth supplied by Directorate General for Energy (DGE)

These scenarios form part of the measures considered expedient for containing the growth in CO_2 emissions, allowing Portugal to fulfil the objective (an increase of 40 per cent) accepted by it in accordance with the terms of the Community framework strategy for the control of CO_2 emissions.

CLIMATIC VULNERABILITY AND ADAPTATION MEASURES

34. The occurrence, in Portugal, of natural disasters of a meteorological or seismic nature, albeit infrequent, is capable of causing significant socioeconomic incidents.

35. Although with different degrees of vulnerability to natural catastrophes all regions to a greater or lesser extent are subject to the occurrence of one type or another with the resulting loss of life, environmental alterations and major material losses.

36. It is in cooperation with international bodies such as the IPCC that a great deal of attention has been paid and care taken on the study of climate changes, based on the work for the studies of socio-economic impacts and the corresponding formulation of strategies for reducing vulnerability.

TECHNICAL AND FINANCIAL RESOURCES

37. Portugal is, since 1992, a member of the pilot stage of the Global Environmental Fund (GEF) with an escudo contribution of 4.5 million special drawing rights (SDR).

38. The necessary internal legal measures are being prepared for the second stage of GEF and the Portuguese Government has formally undertaken to make an escudo payment equivalent to the sum of 4 million SDR. The contribution in question represents more than double Portugal's amount of the "burden-sharing" negotiated for the reconstitution of the GEF.

39. At the Rio Summit Conference, the European Community, under the Portuguese Presidency, undertook to make a contribution of 3 billion ECU for supporting projects to be included as part of the framework of Agenda 21. The member States provided an indication of the amount in question, with the Portuguese contribution being 17 million ECU over a five year period.

40. It was later decided within the group for cooperation and development that the Portuguese annual contribution would be around 2.6 million ECU to be paid for out of the State budget.

41. Reference should be made to the fact that Portugal is participating in a wide range of regional and international financial institutions and organizations whose objective is to provide assistance to developing countries. Reference should be made, inter alia, to participation in the institutions of the World Bank, of the African Development Bank and of the Inter-American Development Bank, in the European Bank for Reconstruction and Development, in the European Investment Bank and in the European Development Fund.

42. In budget terms, the Portuguese contributions to the above referred to institutions and organizations in 1994 will be around 6 thousand million escudos.

43. In bilateral terms and from a regional viewpoint, the main beneficiaries of Portuguese aid will be Portuguese speaking African countries with Mozambique being the main beneficiary of this aid.

44. In budget terms, Portuguese support for the above mentioned objective in 1994 was approximately 8 thousand million escudos.

45. The preservation of and improvement to the environment represent important aspects in living standards and well being. The programme of the 12th constitutional Government has proposed, as an objective for sustained, harmonious and ecologically balanced economic development that "special attention be paid to the principles of prevention and solidarity, in order to identify environmental problems at source".

RESEARCH AND SYSTEMATIC OBSERVATION

46. The problem of climate alterations, resulting from complex phenomena, the dimension of which nowadays has the unprecedented originality of the added influence of global anthropogenic activities, affects all countries.

47. The activities which have, or are to be carried out in this area are concentrated on the following aspects:

- the improvement of observation networks and setting up of new networks with the objective, inter alia, of carrying out research in the field of climate alterations;

- increasing knowledge of the composition of the atmosphere and preventing reductions to the stratospheric ozone layer;

- encouraging the use of the best available, economically viable technologies with the objective of reducing atmospheric emissions and increasing the efficiency of processes for making the most use of resources and the economy of means available;

- publicizing the existence of existing economic mechanisms for encouraging the rational use of energy and technological modernization in the productive sector;

- evaluating the potential of renewable energy sources;

- preparing inventories of emissions and structuring climatological information and information on the quality of the air with the objective of supplying the development of correlational models for the evaluation of cause and effect with climate alterations as a reference.

EDUCATION, TRAINING AND INFORMATION

48. The subject of climate alterations is not a specific course in primary and secondary education. The multi-disciplinary character, however, of environmental education has permitted the inclusion of these themes in various curriculae which, in the case of higher education, is dealt with by specialist studies in various degree level courses.

49. The translation of the text of the agreement has been widely publicized in brochures and expositions.

50. Awareness campaigns and training activities have been designed and developed and directed towards special targets and the public in general, particularly students.

INTERNATIONAL COOPERATION

51. Special reference should be made to the improvements in the relationship between Portugal and Portuguese speaking African countries through the dissemination of the Portuguese version of the framework agreement, in addition to cooperation with Africa in which special reference should be made to the projects with Southern African Development Conference (SADCC):

- Crop and phytogenetic databases, geographical databases for environmental purposes, support for the administrative technical unit for the energy sector (with head offices in Luanda), support for the water survey for hydroelectric applications in the Zambese basin and the study of the Cuneme basin.

52. This cooperation takes various forms, both instrumental (in strengthening the external position of the Portuguese State) and historical and with public aid for development in which Portugal is a member of the group of European Union donor countries (Lomé IV Convention), the Committee for the support of OECD development, UNO agencies, Bretton Woods Institutions and the African Development Bank.

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